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Benchmarking therapeutic drug monitoring software: A systematic evaluation of available computer tools

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Poster: Other Modelling Applications

Objectives: Therapeutic drug monitoring (TDM) aims at optimizing treatment by individualizing dosage regimen based on blood concentrations measurement. Maintaining concentrations within a target range requires pharmacokinetic (PK) and clinical capabilities[1,2]. Bayesian calculation represents a gold standard in TDM approach but requires computing assistance. The aim of this benchmarking was to assess and compare computer tools designed to support TDM clinical activities.

Methods: Literature and Internet were searched to identify software. Each program was scored against a standardized grid covering pharmacokinetic relevance, user-friendliness, computing aspects, interfacing, and storage. A weighting factor was applied to each criterion of the grid to consider its relative importance. To assess the robustness of the software, six representative clinical vignettes were also processed through all of them.

Results: 12 software tools were identified, tested and ranked. It represents a comprehensive review of the available software characteristics. Numbers of drugs handled vary from 2 to more than 180, and integration of different population types is available for some programs. Nevertheless, 8 programs offer the ability to add new drug models based on population PK data. 10 computer tools incorporate Bayesian computation to predict dosage regimen (individual parameters are calculated based on population PK models). All of them are able to compute Bayesian *a posteriori* dosage adaptation based on a blood concentration while 9 are also able to suggest *a priori* dosage regimen, only based on individual patient covariates. Among those applying Bayesian analysis, MM-USC*PACK uses a non-parametric approach. The top 2 programs emerging from this benchmark are MwPharm and TCIWorks. Others programs evaluated have also a good potential but are less sophisticated or less user-friendly.

Conclusions: Whereas 2 software packages are ranked at the top of the list, such complex tools would possibly not fit all institutions, and each program must be regarded with respect to individual needs of hospitals or clinicians. Programs should be easy and fast for routine activities, including for non-experienced users. Although interest in TDM tools is growing and efforts were put into it in the last years[3], there is still room for improvement, especially in terms of institutional information system interfacing, user-friendliness, capability of data storage and automated report generation.

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